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DYNAMIC BALANCING IN A VACUUM

For asymmetric, spin-stabilized spacecraft, aerodynamic forces caused by appendages such as antenna reflectors induce unacceptable errors during dynamic balance operations in air. This aerodynamic poser was solved by JPL by balancing the Intelsat V spacecraft on a vacuum-rated Schenck-Trebel machine in the 25-foot JPL Space Simulator.

The balance facility, believed unique in the United States, measures the amount and direction of unbalance in two planes under vacuum conditions less than 1 torr.

The remote-controlled machine operates between 30 and 240 revolutions per minute. Motors and bearings are hermetically enclosed and cooled with ambient air plumbed through the bottom of the simulator.

Tests on the Intelsat V for the Ford Aerospace and Communications Corporation reduced the spacecraft unbalance from 4.28 kilograms to 30 grams, and the final center of gravity offset was less than 0.002 inches, well within acceptable limits.

Figure (opposite page): The Intelsat V spacecraft is shown attached to the dynamic balance machine in the JPL 25-foot Space Simulator before undergoing unbalance correction.

